

Remarks

Review and reconsideration of the First Office Action of May 2, 2003 is respectfully requested in view of the above amendments and the following remarks.

Claims 1-7 and 9-15 are rejected.

Claims 16-24 have been added.

Claims 1 and 9 have been amended. Support for the amendment can be found in the specification on page 2, lines 1-3 and 8-9.

Claims 1-7 have been amended to correct informalities, as suggested by the Examiner.

Claim 7 has been amended to correct a typographical error.

Claim 12 has been amended to correct a typographical error.

Claims 16 and 17 find support in the specification on page 2, line 23.

Claims 18 and 19 find support in the combination of Claim 1 and 5, as originally filed.

Claims 20 and 23 find support in the specification on page 2, lines 1-3 and 8-9.

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Claims 21 and 22 find support in the combination of Claim 9 and 13, as originally filed.

Claim 24 finds support from the combination of Claims 9 and 13 and from page 3, line 21 in the specification.

Care has been taken to ensure that no new matter is added to the claims.

No claim has been allowed.

In the Specification

The specification has been amended in order to correct typographical errors, as suggested by the Examiner. Care has been taken to ensure that no new matter is added to the text.

In the Claims

Claim Objections

Applicants have amended Claims 1-7 as suggested by the Examiner in order to overcome the Examiner's objection to informalities. Applicants respectfully request the Examiner to remove the objection in light of the amendments.

§ 112 Claim Rejection

Claim 2 has been amended to state proper antecedent basis.

Claims 5 and 14 have been amended as suggested by the Examiner in order to overcome the Examiner's rejection.

Applicants respectfully request the Examiner to remove the § 112 rejections in light of the amendments.

§ 101 Claim Rejection

It is Applicant's belief that the amendments made to Claims 5 and 14 for § 112 purposes also serve to overcome the Examiner's § 101 rejection. Applicants respectfully request the Examiner to remove the § 101 rejections in light of the amendments.

§ 102(b) Rejection- Yoshida et al.

Claims 1, 5-7, 9-10 and 13-15 were rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al. U.S. 4,487,613. It is the Examiner's position that the Yoshida reference discloses a method and a composition for the odorization of hydrocarbon gases comprising the combination of 2-methoxy-3-isobutyl pyrazine and methyl acrylate (see columns 5 and 6, Formulas), which anticipates Claims 1, 5-7, 9-10 and 13-15 of the present invention.

Applicants respectfully traverse.

Regarding Examiner's point 8, paragraphs 2 and 3, Applicants respectfully note that the amendments made to Claims 1 and 9 have distinguished the present invention from the prior art reference by including both a qualitative and quantitative limitation. The amendments to Claims 1 and 9 have qualitatively defined the odor because the odor must be capable of acting as a "warning signal." The odor must be unmistakable and recognizable, which is inherently found in the properties of the chemicals of components "A" and "B". The amendments to Claims 1 and 9 have quantitatively defined the odor because Components A and B must be present in the odorless combustible gas in an amount sufficient to provide a warning signal before the ignition limit of the combustible gas in an enclosed space is reached.

Yoshida discloses the use of 2-methoxy-3-isobutyl pyrazine as a component of a gas-odorizing agent. However, the odor of 2-methoxy-3-isobutyl pyrazine does not act as a warning signal.

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In fact, the odor property of 2-methoxy-3-isobutyl pyrazine is that of a green bell pepper, potato product, coffee, galbanum and green peas (see Attachment A). People know that these odors typically emanate from kitchen and food areas. Thus, these odors would not act as a warning signal for people who smell escaped gas.

The following experiment was conducted to quantitatively measure the warning signal of 2-methoxy-3-isobutyl pyrazine:

A mixture consisting of 60% by weight of ethyl-acrylate, 37% by weight of methyl-acrylate and 3% of 2-methoxy-3-isobutyl pyrazine (according to Yoshida) were combined and measured against a similar mixture using instead 2,3-methyl-ethyl pyrazine (according to the present invention). The dosage was

25mg odorizing composition/m<sup>3</sup> natural gas. The results were measured on a scale of 1-10, with 1 being a very weak warning and 10 being a very strong warning. The composition according to Yoshida scored a 3, and the composition according to the present invention scored a 10. It was concluded that the warning signal comprising the 2-methoxy-3-isobutyl pyrazine is mainly based on the mixture of the acrylates, not on the pyrazine. While the 2,3-methyl-ethyl pyrazine possesses a warning odor of a strength comparable with the industrial standard tetrahydrothiophene (THT), 2-methoxy-3-isobutyl pyrazine according to Yoshida leaves an impression that is almost pleasant. Clearly, the compound according to Yoshida does not teach the warning signal limitation that is found in Claims 1, 9, 20 and 23.

Additionally, Applicants note that 2-methoxy-3-isobutyl is not the main source of odor in the compositions disclosed by Yoshida. Instead, Yoshida teaches odorizing agents comprising primarily of sulfide-containing components (see claim 1 of Yoshida). Indeed, the disclosed formulas (in columns 5-6) show that preferred formulas comprise sulfide-containing components as the main ingredients. In contrast, 2-methoxy-3-isobutyl pyrazine is only present in an amount of 0.5 parts per weight. Accordingly, Yoshida mentions the use of 2-methoxy-3-isobutyl as only an "odor boosting effect" (column 6, lines 53-56). In other words, 2-methoxy-3-isobutyl pyrazine is not disclosed as a genuine odorizing agent, but rather as a component which can enhance the odor of the main (sulfide containing) odorizing components.

The incorporation of the additional limitations into Claims 1 and 9 have served to distinguish the Claims 1 and 9 from the disclosure of Yoshida et al. In order to anticipate, a

reference must teach every element of the claims. Yoshida et al. does not teach every element of the current claims, because it does not disclose the limitations of a warning signal or the concentration of odorizing composition necessary to create a warning signal in an enclosed space before the combustion limit of the gas is reached.

Further, Applicants submit that Yoshida et al. does not teach the limitations of new Claims 16 and 17. Yoshida discloses the use of sulfides and mercaptans to create odor. However, sulfides in combustible gas are corrosive. Thus, the use of sulfides according to Yoshida are prohibited by the limitations of new Claims 16 and 17.

Additionally, Applicants submit that Yoshida et al. does not teach the limitations of new Claims 18 - 24 because Yoshida does not teach the use of a compound comprising a component of formula (I) wherein R<sup>1</sup> to R<sup>4</sup> represent hydrogen or a C<sub>1</sub>-C<sub>4</sub>-alkyl group.

Regarding Examiner's point 8, paragraphs 4-5, Applicants respectfully submit that Claims 5-7 and 13-15 now depend from patentable claims, Claims 1 and 9. Thus, Applicants respectfully request that the rejection be removed.

Applicants believe that Yoshida et al. has not taught the claims of the present invention. Applicants respectfully request that the rejections based on this prior art reference be removed.

§ 102(b) Rejection- Mookherjee et al.

Claims 1-5 and 9-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Mookherjee et al. U.S. 5,321,005. It is the Examiner's position that the Mookherjee reference teaches the combination of living fruit compositions (including ethyl

acetate and methyl butyrate) with an adjuvant (including 2-Ethyl-3-acetylpyrazine, Tetramethyl pyrazine, and 2-Methylpyrazine), which anticipates Claims 1-5 and 9-13 of the present application.

Applicants respectfully traverse.

Regarding Examiner's point 9, paragraphs 2 and 3, Applicants submit that Claims 1, 9 and new claims 16-24 are not anticipated by Mookherjee. In order to anticipate, a reference must teach every limitation of the claims. Applicants respectfully note that the amendment to Claims 1 and 9 and the limitations of new Claims 16-24 limit the claims to a combustible gas. This distinguishes the claims of the present invention from the Mookherjee reference, which does not teach the limitation of a composition according to formula (I) for odorizing a combustible gas. Mookherjee only teaches a composition for fragrance and perfume compositions. Thus, Mookherjee does not teach every limitation of the presently amended claims, and the claims are not anticipated by Mookherjee.

Further, the Mookherjee reference teaches a process for producing flavor and fragrance compositions by analyzing the aroma emitted and the rates of emission from a living fruit (a nectarine or a pineapple). The amendments to Claims 1 and 9 and new claims 20 and 23 require the odor to act as a warning signal to warn of the presence of combustible gas. The smells of nectarine or pineapple, according to Mookherjee, do not act as a warning signal. These odors are known to humans to emanate from kitchen and food areas and would not act as a warning signal for people who smell escaped gas. Thus, Mookherjee does not teach every limitation of the presently amended claims, and the claims are not anticipated by this prior art reference.

Regarding Examiner's point 9, paragraphs 4-5, Mookherjee et al. does not disclose the presence of an acrylic **C<sub>1</sub>-C<sub>12</sub>-alkyl ester**. Applicants respectfully note that the compounds "ether acetate" and "methyl butyrate" mentioned in the office action are **not** "acrylic" esters. Therefore, currently amended claims 2-4 and 10-12 are not anticipated by Mookherjee. Applicants also note that new claims 18-24 also contain the limitation of a C<sub>1</sub>-C<sub>12</sub>-alkyl ester; therefore, they are also not anticipated by Mookherjee.

Regarding Examiner's point 9, paragraph 6, Applicants submit that these claims now depend upon a patentable claim (due to the amendments of Claims 1 and 9), which renders them patentable, also.

Applicants respectfully submit that Mookherjee also does not render the present invention obvious. The Mookherjee invention solves the problem of capturing and reproducing actual aroma ingredients of the living fruits for the perfumery and flavor arts. The invention taught in Mookherjee- how to sample aroma from a living fruit to find out which chemicals are emitted- will not lead one skilled in the art to the method and composition of odorizing gas as claimed in the present invention.

To elaborate, a fragrance is an odor. Any new fragrance that is added merely modifies the odor. Therefore, the prior art reference is not applicable to the present invention because it is directed towards a different invention. The prior art reference collects and analyzes odors and then reproduces that odor, but the present invention adds odor to an odorless gas. In other words, the present invention is directed towards making something that is invisible become visible; Mookherjee is directed towards reproducing something that is already visible.

Finally, Applicants respectfully request that the anticipation rejections based on Mookherjee be removed, as they seem to have been improperly based on a superficial search that amounted to "picking and choosing" compounds from the prior art reference. Out of the 84 adjuvants listed on columns 8 and 9 and out of the 104 identified compounds that are present in a pineapple and that are listed in Table 1 (columns 15-17) in the Mookherjee reference, three adjuvants and two compounds were found to be in common with the present application. The court in *In re Arkley*, 455 F.2d 586, 59 CCPA 804, 172 USPQ 524 (1972) held that "the reference must clearly and unequivocally disclose the claimed compound or direct those skilled in the art to the compound without **any** need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference." (emphasis in original). *Id.* 455 F.2d at 587, 59 CCPA at 807, 172 USPQ at 526. Thus, Applicants respectfully request that the anticipation rejections based on the Mookherjee prior art reference be removed in light of the holding of *In re Arkley*.

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Applicants believe that Mookherjee et al. has not taught the claims of the present invention. Applicants respectfully request that the rejection based on this prior art reference be removed.

103(a) Rejection- Yoshida et al.

Claims 2-3 and 10-11 are rejected under 35 U.S.C. 103(a) as being obvious over Yoshida '613. It is the position of the Examiner that, even though Yoshida fails to specifically disclose two different acrylic esters, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use ethyl acrylate (as disclosed by the



Japanese Patent '804) in combination with the methyl acrylate of Yoshida because Yoshida discloses combinations of ethyl acrylate useful for odorization (see column 1, lines 14-16 and 64-68; column 2, lines 1-6).

Applicants respectfully note that Claims 1 and 9 have been amended to overcome the prior art rejections. Claims 2-3 and 10-11 now depend from patentable claims; therefore, they should also be deemed patentable.

Further, Claims 1, 9, 20 and 23 of the present invention are not obvious in light of Yoshida in combination with the '804 Japanese reference, because the inherent chemical property of the nitrogen compound disclosed by the '804 Japanese reference (triethyl amine) is a **fishy** odor (see Attachment B). A fishy odor, similar to the green bell pepper, nectarine and pineapple odors discussed above, will not act as a warning signal to people of the presence of combustible gas.

Further, new claims 16 and 17 require the odor imparting components to be non-corrosive. Triethyl amine, as disclosed by Yoshida and Japan '804: a) is reactive, b) has a high pH that results in the formation of an acid in the presence of moisture in the gas pipelines, and c) is corrosive to the skin. Therefore, the composition according to Yoshida expressly teaches away from the composition according to the present invention, which requires the odor-imparting component to be non-corrosive.

Applicants believe that the claims of the current invention are not obvious with respect to Yoshida et al. Applicants respectfully request that the rejection based on this prior art reference be removed.

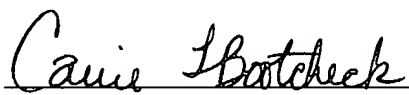
**In the Abstract**

The abstract has been amended in order to correct a typographical error. Care has been taken to ensure that no new matter is added to the text.

Favorable consideration and early issuance of the Notice of Allowance is respectfully requested. Should any minor points remain prior to issuance of a Notice of Allowance, the Examiner is requested to telephone the undersigned at the below listed telephone number.

Respectfully submitted,

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Carrie L. Bootcheck  
Registration No. 50,712

Date: **August 4, 2003**

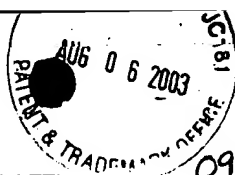
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**CERTIFICATE OF MAILING AND AUTHORIZATION TO CHARGE**

I hereby certify that the foregoing AMENDMENT A for U.S. Application No. 09/762,847 filed March 12, 2001, was deposited in first class U.S. mail, postage prepaid, addressed: Commissioner for Patents; P.O. Box 1450; Alexandria, VA, 22313-1450, on **August 4, 2003**.

The Commissioner is hereby authorized to charge any additional fees, which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment, to Deposit Account No. 16-0877.

  
Carrie L. Bootcheck



Methoxy-3-isobutyl Pyrazine, 2-

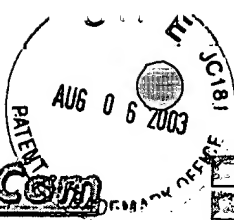
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3968.062

Synonyms : butyl iso -3-methoxypyrazine, 2-; methoxy-3-isobutyl pyrazine, 2-  
Odor Description : Green Bell Pepper Green Pea Galbanum  
Appearance : Colorless Liquid  
Mol./Wt. : 166.2224  
Formula : C<sub>9</sub> H<sub>14</sub> N<sub>2</sub> O  
Nafta H. # : 2933.90  
Cas. # : 24683-00-9  
Einecs # : 246-402-1  
Specific Gravity : 0.99000 - 0.99500 @ 25.00 °C. 8.238 - 8.279 Pounds Per Gallon  
Refractive Index : 1.48800 - 1.49200 @ 20.00 °C.  
Boiling Point : 214.00 - 215.00 °C. @ 760.00 mm  
Soluble in : Alcohol  
Insoluble in : Water, Slightly  
Perfumery Uses : Fresh; Green; Metallic; Petitgrain  
Natural : Bell Peppers, Green; Potato Products; Coffee; Galbanum; Pea, Green;  
Occurrence : Capsicum  
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Triethyl amine [121-44-8]

Synonyms: N,N-diethylethanamine; N,N,N-TRIETHYLAMINE; TEA; TEN; TETN; Triethyl amine; Triethylamine ;

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<a href="#">Formula</a>	C <sub>6</sub> H <sub>15</sub> N	<a href="#">Molecular Weight</a>	101.1912
<a href="#">CAS RN</a>	121-44-8	<a href="#">Melting Point (°C)</a>	-114.7
<a href="#">ACH Number</a>	X1001530-8	<a href="#">Boiling Point (°C)</a>	88.9
<a href="#">Density</a>	0.728	<a href="#">Vapor Density</a>	3.5
<a href="#">Refractive Index</a>	1.401	<a href="#">Vapor Pressure</a>	54
<a href="#">Evaporation Rate</a>	5.6	<a href="#">Water Solubility</a>	0.02 g/100 mL. Soluble
<a href="#">Flash Point (°C)</a>	-11	<a href="#">EPA Code</a>	U404
<a href="#">DOT Number</a>	UN 1296 Flammable liquid	<a href="#">RTECS</a>	YE0175000
<a href="#">Comments</a>	Colorless liquid with a fishy odor. LACHRYMATOR.		

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<a href="#">MSDS</a>	<a href="#">Physical Properties</a>	<a href="#">Regulations</a>	<a href="#">Structures</a>